



U.S. Department
of Transportation
**Federal Aviation
Administration**

Memorandum

Subject: INFORMATION: Aircraft Certification Procedures Applicable to Applicants of Differential Global Positioning Systems (DGPS) for Special Category I (SCAT-I)

Date: 31 August 95

From: Manager, Aircraft Engineering Division, AIR-100

Reply to Attn. of: B. DeCleene
(202)267-8049

To: ALL ACOs

In order to expedite the implementation of satellite-based navigation, the aeronautical industry, in cooperation with the FAA, developed RTCA/DO-217, *Minimum Aviation System Performance Standards (MASPS) DGNSS Instrument Approach System: Special Category I*. The FAA adopted this standard in Order 8400.11, *IFR Approval for Differential Global Positioning System Special Category I Instrument Approaches Using Private Ground Facilities*. The role of aircraft certification is described Chapters 7 and 11 of this Order, Airborne Systems. This memorandum is intended to elaborate on those chapters and clarify the role that aircraft certification plays in SCAT-I approvals.

Several manufacturers are expected to apply for both SCAT-I certification and TSO-C129 authorization. TSO authorization should only be granted if the SCAT- functionality is inaccessible and is demonstrated not to interfere with TSO-C129 compliance. For those manufacturers who are modifying TSO-C129 equipment in order to incorporate SCAT-I capability, the TSO authorization is invalidated when the equipment is modified. However, a GPS approval can be issued via TC or STC, provided the SCAT-I functions cannot interfere with normal operation of the equipment. AC 20-138 and AC 20-130A provide an acceptable means of compliance.

Upon receiving an application for installation approval of a SCAT-I system, the certification engineer should obtain a copy of both Order 8400.11 and RTCA/DO-217. Due to the unique nature of this application, the engineer should notify AIR-130 that an application has been received. AIR-130 is the aircraft certification focal point on a team of headquarters personnel intended to coordinate the overall SCAT-I approval process. This team is comprised of the following organizations (contacts are listed for your reference):

AIR-130	James Williams (202-267-9562) Bruce DeCleene (202-267-8049)
AFS-400	James Enias (202-267-7208)
AFS-200	Don Streeter (202-267-7579)
ALM-6	Bill Dixon (202-267-9147)

	Roamey Viles (202-267-9826)
ASR-200	Don Willis (202-267-9715)
ATP-20	Tim Halpin (202-267-7779)
AOS-240	Randy Key (405-954-9169)
AVN-5	Jim Snow (405-954-9568)

In addition, a field team will be constructed when a certification project is opened. The headquarters team, with the assistance of the ACO, will be responsible for identifying all field personnel who should participate.

Since SCAT-I ground equipment is not ensured to be interoperable, the applicant must have a ground system against which system performance will be validated. That ground system must be mature enough to undergo concurrent evaluation with the avionics. Applicants must identify the ground system they intend to use as part of their application. If the ground system has not been submitted to AOS-240 for type acceptance, the ACO engineer should advise the applicant that the SCAT-I avionics certification cannot proceed. To determine if a ground system has been submitted for type acceptance, the engineer may contact AIR-130 or AOS-240.

The applicant must demonstrate that they meet all of the performance requirements of Order 8400.11 and RTCA/DO-217. (Requirements can be found in Sections 2.2 and 2.4. Sections 2.5.3, 2.5.4, 3.1.1, and 3.3.3, as modified by Order 8400.11, contain related test procedures.) Specific certification issues are discussed in Chapter 7 of Order 8400.11. If a VHF data link is to be used, the airborne system must use the data link defined in Change No. 1 to RTCA/DO-217.

Particular attention should be given to the accuracy and integrity compliance. The airborne accuracy requirement includes the performance of the ground system (as installed), airborne DGPS, and aircraft control system (autopilot/flight director/pilot). This evaluation cannot be completed until the applicant has an installed ground facility and has made application for an installation approval at that ground facility. The ACO engineer should cooperate with airways facilities personnel to determine if the installation is ready for compliance testing.

The integrity compliance must be done in coordination with the ground system design. A system safety assessment must be performed on all system components, including space, ground, data link, and airborne components [Paragraph 7-1(j)(1) of Order 8400.11]. While the type acceptance of the ground system includes an evaluation of the ground system integrity, it is the responsibility of the ACO engineer to evaluate and approve the system safety assessment (including space, ground, data link, and avionics).

Finally, the ACO must evaluate and approve the applicant's database integrity. An acceptable means is outlined in Chapter 11 of Order 8400.11. Another acceptable means is to utilize a 32-bit Cyclic Redundancy Check on the precision approach record to protect data from undetected errors. This approach is being taken for the FAA-procured Wide Area Augmentation System (WAAS).

If you have any questions regarding the SCAT-I approval process, please contact Bruce DeCleene at (202) 267-8049.

John K. McGrath

CC: the people listed on page 1